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PR performs weightless experiment

WRIGHT-PATTERSON AIR FORCE BASE, Ohio —-Travis Michalak (left) and 2nd Lt. Ryan Claycamp monitor a Propulsion Directorate experiment aboard a specially equipped NASA KC-135A that simulates microgravity, or weightlessness, conditions in space. The two endured as many as 160 parabolic flight maneuvers to simulate weightlessness in an effort to find new ways to combat the ever-increasing problem of space thermal management - the cooling of powerful electronic devices used in space vehicles like satellites, the space shuttle and the International Space Station. Led by Dr. Kirk Yerkes, an expert in heat transfer and fluid mechanics engineering, the team's challenge is to remove the heat generated by the more powerful semiconductors and electronic devices that will power the next-generation of space vehicles. (Air Force photo)

Crew benefits from headset upgrade

by Karen Eizenga, Human Effectiveness Directorate

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — In an effort to provide both clearer communication and more effective hearing protection for aircrews, Active Noise Reduction (ANR) headsets will be available by year's end.

Attempting to protect against hearing loss while maintaining effective communication over interior aircraft noise has been a long-standing challenge for aircrews.

This was an especially common problem faced by aircrews for the E-3 Sentry Airborne Warning and Control System (AWACS) aircraft. To provide both clearer communication and more effective hearing protection, active noise reduction headsets will be implemented by the end of the year.

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Commander
Maj. Gen. Paul D. Nielsen

Director of Public Affairs
Deborah Csutoras

Production Editor
Jill Bohn

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http://extra.afrl.af.mil/news/index.htm

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Bose Aviation Headset X

ANR technology, pioneered in the 1970s by the Air Force Research Laboratory in conjunction with the Bose Corporation, employs an electronically emitted "anti-noise" wave that essentially jams the extraneous noise coming into the ear cup. On missions that can last up to 18 hours, reducing strain on the ears also assists in decreasing the overall level of fatigue experienced by the aircrew.

Correspondence from the Air Force Requirements Oversight Council in 2002 called for implementation of ANR technology on all applicable Air Force aircraft. In response, the AWACS System Program Office approached researchers in the Crew Systems Interface Division of the Human Effectiveness Directorate, Warfighter Interface Team, to find the most cost effective and viable option available on the current market.

Over the course of 10 months, the Human Effectiveness research team gathered in-flight noise measurements, performed objective tests on all headsets in the laboratory, and collected human factors evaluations data while the headsets were used during missions. Ten different assessment parameters were collected on every headset and combined using subject-matter expert importance weights to create an overall score.

The top two headsets not only provided excellent active noise reduction, but also were also highly rated in terms of their usability, fit, comfort, and expected operating costs.

They were subjected to a second head-to-head comparison of their use over a four-week period. At the conclusion of both evaluations, researchers concluded the Bose Aviation Headset X offered a lighter, more comfortable fit and efficient hearing protection. The headset can also support stereo sound, a characteristic that the current headset lacks, which will set the stage for integration of future technologies such as three-dimensional audio capabilities for the operators.

The ANR headset lowered the noise level going into the ear by 12 decibels, according to Lt. Col. Brian Donnelly, Deputy Director, Warfighter Interface Team and former AWACS operator. "It was a radical difference," he said. "Having flown about 1700 hours on the AWACS, listening to that drop in noise level was pretty remarkable…it was important."

Historically, many AWACS operators suffer asymmetric hearing loss caused by years of flying with one of their earphones off in order to converse with their aircrew. Participants of the study indicated that the new headsets suppressed the noise enough that they didn't feel the need to pull one earphone off and talk on the jet without using the intercom. "That practice is potentially a thing of the past," Donnelly said.

In December, officials at the 552nd Air Control Wing at Tinker Air Force Base, Okla., will begin providing the ANR headsets to all assigned AWACS flight and mission crewmembers. @

MN Directorate completes weapon powered flight test

by Rex Swenson, Munitions Directorate

EGLIN AIR FORCE BASE, Fla. — The Air Force Research Laboratory's Munitions Directorate and Lockheed Martin Missiles & Fire Control of Dallas successfully completed a powered flight test of its Low Cost Autonomous Attack System (LOCAAS) weapon.

The test included deploying its wings and starting its engine following release from a Cessna 441 Conquest II test aircraft flown by Aeromet of L3 Communications located in Tulsa, Oklahoma.

This was the maiden flight test of the Technical Directions Inc. (TDI), Ortonville Michigan J-45G turbojet engine previously developed under a Small Business Innovative Research effort. After the wings were fully deployed, locked, and stable flight achieved, the engine windmill started and accelerated to the desired speed conditions to conduct the test mission profile.

LOCASS hanging under the Cessna 441 Conquest II test aircraft

During the remainder of the mission profile, the LOCAAS Laser Detection And Ranging (LADAR) seeker and Autonomous Target Acquisition (ATA) algorithms successfully detected and identified the correct re-locatable target, then guided to a simulated detonation point. The LOCAAS navigated through pre-determined waypoints to scan two search areas. The first search area had no target vehicles within it while the second was populated with both the intended target and other vehicles designed to spoof the LOCAAS. The seeker found the right target, engaged it, and photographed the target using a camera inserted in the place of a warhead and triggered at the computed warhead fire event. @

Human Effectiveness director plans internal reorganization

by Karen Eizenga, Human Effectiveness Directorate

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — The Air Force Research Laboratory's Human Effectiveness Directorate is experiencing both change and progress under the leadership of its new director, Dr. Hendrick Ruck, who stepped into that role a few months back.

The most recent modification took effect Nov. 1, as the directorate experienced a major divisional reorganization that will provide closer links between divisions that share common technological focus such as acceleration, fatigue management and bio-technology.

"We have been able to pull together divisions that deal with similar programs," Ruck said. "In this way, we can have a single manager responsible for those resources."

The changes are designed to not only streamline management but also to encourage communication and partnership within and between all of the divisions.

Over the last five months, Ruck has admittedly "shaken things up" within the directorate. "My goal was not to change the organization in terms of shape," Ruck said. "But I did want to open it up a bit more, to be more innovative."

His intention isn't to promote out-of-the-box thinking as much as it is to promote the taking of certain risks. "I want to encourage thinking about proposals that could possibly fail," he said. "If you don't fail occasionally, I don't believe you're pushing the state of the art."

With over 15 years of experience in nearly every level of the laboratory, Ruck brought with him a distinct idea of what he wanted the directorate to be and what changes could be made. Two particular areas he would like to advance are providing more significant products for the surgeon general and working more closely with AFRL's Information Directorate in cognitive sciences and decision effectiveness as it pertains to Command, Control and Communication (C3) computer systems.

Increasing his accessibility is another change Ruck has implemented. One week out of every six on Ruck's schedule is committed to conducting his business from each of the two satellite offices located at the Mesa Research Site in Mesa, Ariz., and at Brooks City Base in San Antonio, Texas.

"If I spent all of my time at Wright-Patterson, 60 percent of my people would never see me," Ruck said.

Being on-site helps him maintain a better understanding of active programs and allows more direct access and communication between him and the staff at both sites. @

IF Engineer of the Year named at Heritage Day ceremony

by Fran Crumb, Information Directorate

ROME, N.Y. — Elizabeth S. Kean was presented with the Air Force Research Laboratory Information Directorate's 2002 Ralph I. Cole Engineer of the Year Award during ceremonies Oct. 16.

Also honored at the directorate's Heritage Day ceremonies were Dr. David H. Hughes, who was presented with the Fred I. Diamond Award in recognition of having the best technical paper published during the past year, and Dr. Kevin A. Kwiat, who received the directorate's Basic Research Award.

The Cole Award, named in honor of the first chief scientist at Rome Air Development Center (renamed Rome Laboratory in 1990 and now part of AFRL), is conferred annually on a laboratory engineer for engineering achievements in design, research, development, or management during the past three years.

Kean, a Rome native, is a senior computer scientist in the Information Systems Division. In that position, she is senior program manager in the Systems Concepts and Applications Branch, responsible for applying new technologies for the warfighter in the area of information technology resource and enterprise management. She is currently managing the development of a system situational awareness capability for the Air Operations Center of the Future.

Kean was cited specifically for outstanding engineering management of the Master Caution Panel program, transitioning badly needed administrative tools to the complex information systems being used by warfighters. Her personal intervention, sound judgment and skill were directly responsible for the program's success.

A 24-year member of the Rome staff, Kean received a bachelor's degree in mathematics from Utica College and earned her master's degree in computer science from Syracuse University.

Hughes, also a native of Rome, has been a member of the laboratory staff for the past 30 months. He is currently a physicist in the directorate's Information Grid Division, where he performs basic research in wave propagation, quantum information sciences, as well as program management in image processing and quantum optics.

He holds a bachelor's degree in physics from the University of Missouri-Rolla and a master's in the same field from Hunter College - City University of New York. He was awarded his doctorate degree in physics from Washington State University.

Hughes was selected for the Diamond Award, named in honor of the laboratory's chief scientist from 1981 to 1992, for his contributions to the paper "Moment Densities of Propagating Wave Fields," accepted for publication in the Journal of Modern Optics.

Kwiat, a native of Utica, has been a member of the Rome staff for more than 20 years. He is currently a senior computer engineer in the Information Grid Division, where he is responsible for exploring ways to adapt techniques from fault-tolerant computing to solve information assurance problems.

He was awarded his two bachelor's degrees from Utica College and his master's and doctorate degrees from Syracuse University. He currently serves as an adjunct professor of computer science at the State University of New York Institute of Technology, Utica College and Hamilton College.

Kwiat was cited for his groundbreaking research into "Information Survivability in Distributed Systems." His novel adaptation of concepts from the field of fault-tolerant design to address critical needs within the Information Assurance community has opened a vibrant, productive and critical area of research supporting Air Force needs. @

VA's engineers among newly named AIAA fellows

by Melissa Withrow, Air Vehicles Directorate

WRIGHT-PATTERSON AIR FORCE BASE, Ohio —Three engineers at the Air Force Research Laboratory's Air Vehicles Directorate were recently announced as American Institute of Aeronautics and Astronautics (AIAA) Associate Fellows for 2003.

Dr. Gregory Addington, Dr. Jonathan Poggie, and Dr. Jeffery Zweber were honored based on their accomplishments in important engineering or scientific work, original work of outstanding merit, or outstanding contributions to the arts, sciences, or technology of aeronautics or astronautics. Addington is currently VA's airframe-propulsion integration 6.3-program manager. He has been working for VA since 1991 researching high angle-of-attack aerodynamics, vortex-dominated flows and air vehicle stability and control. He has been a test engineer at the VA experimental aeronautical sciences laboratories and also a research engineer and program manager for flow control technology development and airframe-propulsion integration. He received his doctorate in aerospace engineering from the University of Notre Dame in 1998.

Poggie joined VA in 1995 after receiving his doctorate in mechanical and aerospace engineering at Princeton University. Since that time, he has worked in the areas of experimental hypersonic boundary layer stability and transition and more recently the areas of computational plasmadynamics and magnetohydrodynamics. He is internationally known for work in developing and evaluating electromagnetic flow control concepts for hypersonic systems, which have the potential to revolutionize the design of aerospace vehicles.

Zweber received his doctorate in aerospace engineering from the Georgia Institute of Technology in 1995. He is the deputy for VA's Space Operations Vehicle Integrating Concept Office, currently on temporary assignment as deputy for the space access pillar of the National Aerospace Initiative (NAI) office in Washington, D.C. NAI is a partnership between the DoD and NASA designed to sustain America's aerospace leadership. Since arriving at VA, Zweber has also been the Air Force lead for the Systems Engineering Work Breakdown Structure element of the Air Force/NASA One Team on the "120 Day Study." He has represented AFRL on NASA's Space Launch Initiative Systems Engineering and Architecture Definition Evaluation Team and been a project engineer for the Supersonic/Hypersonic Vehicle Design Simulation System Dual Use Science and Technology project.

AIAA has been the principal society of aerospace engineers and scientists for over 70 years. It is the world's largest professional society devoted to the progress of engineering and science in aviation, space, and defense. @

Seven from Information Directorate honored for supporting research mission

by Fran Crumb, Information Directorate

ROME, N.Y. — Four Air Force Research Laboratory's Information Directorate scientists and engineers were presented with awards for scientific and technical achievement during the directorate's "Heritage Day" observance Oct. 16.

The awards are named after former Rome Air Development Center (RADC) officials. RADC was established at the former Griffiss Air Force Base in June 1951, redesignated in 1990 as Rome Laboratory, and became part of AFRL in 1997.

Receiving awards for their achievements during the past year were:

— The Maj. Gen. John C. Toomay Award: Capt. John L. Bebo, an airborne signals intelligence systems test engineer in the Information and Intelligence Exploitation Division.

The award honors a commissioned officer for a single notable achievement or outstanding contribution during the previous year, which did not necessarily result in a single notable achievement, but contributed significantly to the overall effectiveness of the program. It is named for RADC's 9th commander, who served from Jan. 16, 1971, to May 22, 1972, and retired in 1979, after serving as deputy chief of staff for Plans and Programs at the former Air Force Systems Command, Andrews Air Force Base, Md.

A native of Michigan, Bebo has been a member of the Rome staff for the past 18 months. He holds a bachelor's degree in computer science from the University of Nebraska at Omaha and was awarded his master's degree in computer science from the Air Force Institute of Technology. He enlisted in the Air Force in 1985, and received his commission in 1999. Bebo was cited for significant test achievement for a prototype to improve pilot survivability by successfully demonstrating the ability to pinpoint the location of downed pilots at twice the range of current systems. He further improved the system architecture by enabling ground radio interrogation, which is faster and less prone to error than current technology.

— The Harry S. Davis Memorial Award: Vaughn T. Combs, electronics engineer in the Information Systems Division. The award is presented each year to a laboratory scientist or engineer for outstanding technical achievement, usually contributing toward the solution of an operational problem. The award is named for the RADC chief scientist from 1952 to 1960 who later served in high Department of Defense positions, including deputy undersecretary of the Air Force.

Combs, a native of Rome, is a senior software systems developer in the Joint Battlespace Infosphere Group, leading internal advanced platform design, development and integration within the group.

He received both bachelor's and master's degrees in electrical and computer engineering from Clarkson University. A member of the Rome staff for 17 years, Combs was cited for outstanding technical achievement in the development of a freely distributable publish-and-subscribe capability for the Joint Battlespace Infosphere. His work will transform the future information management capability of the Department of Defense.

— The Oliver G. Tallman Memorial Award: Marc J. Pitarys, technical director of the X-45 Joint-Unmanned Combat Air System (J-UCAS) program with the directorate's Information Technology Division at Wright-Patterson Air Force Base, Ohio.

The award is named for the RADC director of engineering from 1951 to 1963 and is conferred annually on a scientist, engineer or technician chosen on the basis of outstanding engineering support achievement, the major part of which was contributed to by the individual.

A resident of Dayton, Ohio, Pitarys is responsible for the technical activities related to the X-45 J-UCAS and leads the X-45 government technical team.

He is a native of Nashua, N.H., and received a bachelor's degree in electrical engineering from the University of New Hampshire. He earned masters' degrees in applied mathematics and management science from the University of Dayton.

Pitarys was cited for outstanding engineering support to the Unmanned Combat Air Vehicle (UCAV) program in the area of advanced mission control. His superior technical knowledge, leadership skills and dedication led directly to the successful research, development, testing and evaluation of a UCAV mission control capability for target engagement, air vehicle hand-off, and mission contingency handling delivered for the first-ever UCAV flight test.

— The Joseph J. Naresky Memorial Award: Scott J. Shyne, senior computer scientist in the Distributed Information Systems Branch of the Information Grid Division and a 14-year member of the Rome staff. The award is conferred annually on a laboratory scientist or engineer for outstanding contributions to systems engineering. It is named for the former chief of the Reliability and Compatibility Directorate from its inception until his retirement in 1979.

A native of Manlius, N.Y.Shyne earned an associate's degree from Hudson Valley Community College and earned both bachelor's and master's degrees in computer science from the State University of New York Institute of Technology.

Shyne was cited for his outstanding achievements in systems engineering for computer and communications network systems. His efforts to develop multi-level security protocols for networks will ensure that the next generation of Air Force enterprise and combat information systems will be reliable and secure.

Shyne was the recipient of the Air Force Materiel Command 2002 International Award for Armaments Cooperation. He was also the recipient of the 1993 Griffiss Air Force Base Civilian of the Year Award and the Information Directorate's Harry Davis Award in 2000. @

Net Index

Due to the number of submissions we receive, some sections of *news@afrl* are available exclusively on-line. The on-line version of the newsletter allows users to view the AFRL corporate calendar, news releases generated by AFRL headquarters, operating instructions, L@b L@urels and Roundups sections.

The L@b L@urels section of the electronic newsletter is dedicated to members of Air Force Research Laboratory who receive awards and honors. The Roundups section of the electronic newsletter keeps Air Force Research Laboratory employees informed about contracts AFRL has awarded. Below is an index of articles one can find in each of these on-line sections.

L@b L@urels

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- **Sensors Directorate honors best and brightest**
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To view the full text of these and other articles visit the *news@afrl* page on the Internet at http://extra.afrl.af.mil/news/index.htm.
To submit L@b L@urels or Roundups from your directorate, send a query to AFRL Public Affairs at:

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For more on these stories see news@afrl
http://extra.afrl.af.mil/news/index.htm

Gen. Martin briefed on MN technologies

EGLIN AIR FORCE BASE, Fla. — 2nd Lt. Oluyomi Faminu is shown briefing Gen. Gregory Martin, AFMC/CC about a spin-off of the Micro Air Vehicle program known as "BAT-CAM" (Battlefield Air Targeting-Camera Autonomous Micro air vehicle). BAT-CAM is being developed at Eglin's Air Force Research Laboratory Munitions Directorate for ground force reconnaissance. (Air Force photo by Greg Murry, DynCorp)